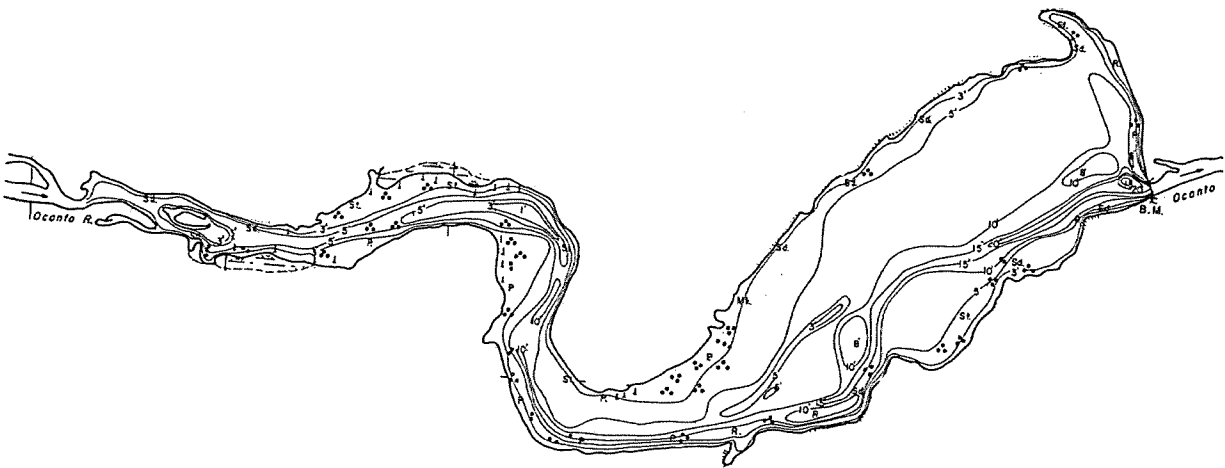


Machickanee Flowage, Oconto County, Wisconsin

Fisheries Survey Report, 2017

Waterbody Identification Code: 448200



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December 2017

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SUMMARY

Lake and location

Machickanee Flowage, Oconto County, T28N R20E Sections 31, 32, 33, and 34, and T27N R20E Section 4. Located in the towns of Stiles and Abrams.

Physical/chemical attributes

Surface acres:	436 acres
Maximum depth:	21 feet
Lake type:	flowage/impoundment
Water chemistry:	hard water, slight alkalinity, low transparency
Littoral substrate:	sand and muck
Shoreline:	6.1 miles
Aquatic vegetation:	Dominant vegetation (2017 survey by WDNR Water Resources staff Brenda Nordin) includes Coontail (<i>Ceratophyllum demersum</i>), flat-stem pondweed (<i>Potamogeton zosteriformis</i>), Northern watermilfoil (<i>Myriophyllum sibiricum</i>), and Eurasian watermilfoil (<i>Myriophyllum spicatum</i>).
Aquatic invasives:	Eurasian watermilfoil, curly-leaf pondweed, zebra mussels, rusty crayfish, flowering rush, purple loosestrife

Purpose of surveys

Baseline lake survey Tier I assessment

Dates of fieldwork

Fyke netting survey conducted April 3, 2017 through April 12, 2017. Electrofishing survey conducted May 24, 2017.

Fishery

Largemouth bass, northern pike, bluegill, black crappie, rock bass, yellow perch, pumpkinseed, and bullhead are present.

Acknowledgements

Data collection for the 2017 survey was completed by WDNR fisheries staff Ronald Rhode, Tammie Paoli, Ben Ewoldt, Kevin King, Mike Donofrio, and Emily Kurszewski. Fish aging and data entry was completed by Ronald Rhode.

BACKGROUND

Machickanee Flowage is an impoundment of the Oconto River with an area of 436 acres and a maximum depth of 21 feet. The littoral area is primarily sand and muck. The existing dam (Stiles dam) was constructed in 1949, has a head of 19 feet, and is owned by Oconto Electric Cooperative. The only boat landing on the flowage is owned and maintained by Oconto County and is located just upstream from the dam. There is a pier at the landing that provides shore fishing opportunities. Two walk-in access locations are owned by the Town of Stiles and are located off Machickanee Lane and Birchwood Shores Lane on the north side of the flowage. The 6.1 miles of shoreline is moderately developed as homes and seasonal cottages. A total of 63 piers were counted on a recent aerial photo, averaging one dock for every 511 feet of shoreline. However, the number of docks does not truly reflect development on Machickanee since much of the shoreline has steep banks or shallow, weedy shorelines that are not ideal for a dock. Four Class I trout streams (Splinter, Brehmer, Coopman, and Dump Creeks) empty into Machickanee Flowage. The Machickanee Flowage Advancement Association is a non-governmental group that is active in the lake community.

Current fishing regulations follow the general inland regulations. No fish have been stocked in Machickanee Flowage since the early 1980s, after an extensive restoration project in 1981 that included a drawdown and chemical treatment to reduce a high population of rough fish, followed by stocking¹. Fisheries surveys conducted from 1995 to 2017 are shown in Table 1.

METHODS

Eight standard 3' x 6' hoop fyke nets with ¾" bar, 1 ½" stretch mesh were set at ice-out on April 3, 2017 (Figure 1). Only seven nets were fished from April 5 to April 12 due to abundant muskrat holes in Net 3. Nets were lifted daily from April 4 through April 12, except for two nets that were not lifted on April 6 due to high winds. Total effort was 65 net nights. All fish captured were identified to species. Gamefish were measured to the nearest 0.1 inch and given a top caudal fin clip (for mark recapture population estimate). Scales (northern pike) or dorsal spines (walleye, bass) were collected from 5 gamefish per 0.5 inch group per species. Scales or anal spines (yellow perch) were collected from five panfish per 0.5 inch group per species. Lengths on at least 250 of each panfish species were taken to the nearest 0.1 inch with the remainder counted.

A WDNR standard direct current double anode electrofishing boat was used to sample 4 miles of shoreline on the evening of May 24, 2017. All fish were collected for two staggered 0.5 mile transects and only gamefish were collected for the remaining 3 miles of shoreline that were sampled (Spring Electrofishing II) per protocol. Fish were measured to the nearest 0.1 inch and gamefish were inspected for a top caudal fin clip.

¹ R.A. Rost, J.C. Brand, R.M. Bruch, D.H. Crehore, S.I. Dodson, R.L. Fassbender, L.J. Herman, T. F. Rasman, and A.M. Stranz. 1989. Water quality and restoration of the lower Oconto River, Oconto County, Wisconsin. Wis. Dep. Nat. Resour. Tech. Bull. No. 164. 37 pp.

RESULTS

Water temperature at the start of the spring netting survey was 47F and only rose to 50F during the survey. A total of 13,672 fish (including recaptures) of sixteen different species were collected throughout the survey period (Table 2). Catch per gear type is shown for each species sampled (Tables 3 and 4). Bluegill, black crappie, yellow perch, pumpkinseed, northern pike, and largemouth bass were common.

Bluegill

Bluegill were the most abundant panfish species captured, with a total of 9,158 sampled. The catch rate was 138/net night and 218/mile for electrofishing (Tables 3 and 4). The catch rate for bluegill in fyke nets was over three times greater than the 2003 survey. Average length was 5.8 inches with a range from 2.9 to 9.0 inches (Figure 2). Size structure is fair, with 46% being 6 inches or greater, but only 2% being at least 8 inches. There was good representation of several age classes. The oldest bluegill, estimated at 11 years old, was 8.3 inches. The growth rate of bluegills is similar to the northeast Wisconsin average and do not exhibit signs of stunting (Figure 3).

Black Crappie

A total of 233 black crappies were sampled, compared to 676 in the 2003 survey. The catch rate was 3.3/net night and 20/mile for electrofishing (Tables 3 and 4). The average length was 7.0 inches with a range from 3.2 to 12.6 inches (Figure 4). Ages 2 and 5 comprised the majority of the sample. Two or three strong year classes are common in black crappie which have cyclic year classes. The mean length at age shows that black crappie in Machickanee Flowage are growing at similar rates compared to other populations in northeast Wisconsin (Figure 5).

Yellow Perch

Yellow perch were the second most abundant panfish species captured, with the majority (97%) of the total of 3,536 perch captured in Nets 7 and 8. The catch rate was 54/net night, which was significantly greater than 0.7/net night sampled in the 2003 survey (Table 3). Size structure is good, and average length was 7.4 inches with a range from 5.6 to 11.4 inches (Figure 6). Age 6 yellow perch comprised 64% of the catch. It is possible that some of these age 6 perch are spillovers from a private stocking event in the next upstream flowage, Oconto Falls Pond. In 2012, 5500 yearling yellow perch were stocked in Oconto Falls Pond. No other yellow perch stocking has occurred in recent years in Oconto Falls Pond or Machickanee Flowage. For most age classes, yellow perch in Machickanee Flowage are growing slower than other inland lakes in northeast Wisconsin (Figure 7). This slow growth may be density dependent, meaning that high abundance of a species competes for limited food resources and therefore exhibits slow growth.

Northern Pike

A total of 177 northern pike were sampled including 10 recaptured individuals. The catch rate for spring fyke netting was 2.6/net night (Table 3), down from 9.1/net night in 2003. Average length was 22.1 inches with a range from 10.3 to 36.3 inches (Figure 8). Size structure was excellent with 75% of the fish being greater than 21 inches with multiple age classes contributing. Northern pike growth rates were similar to the northeast Wisconsin average (Figure 9). The population estimate for northern pike was 701 adults (1.6 per acre), with a 95% confidence range between 398 and 1,331 fish. This estimate is considered a low population density for pike. In comparison, the 2003 population for northern pike was estimated at 347 adults while the 1995 population estimate was 708 fish.

Largemouth Bass

Largemouth bass were the dominant predator species captured, with a total of 194 sampled, including two recaptured individuals. Total numbers of largemouth bass captured was down compared to the 2003 survey (Table 3). The catch rate for spring fyke netting was 1.2/net night and 29/mile for electrofishing (Tables 3 and 4). Average length of largemouth bass was 11.5 inches with a range from 2.0 to 21.1 inches. Although average size and the proportion of legal size bass were less compared to 2003, the size structure is still fair with 55% of bass over the 14-inch size minimum (Figure 10). It takes approximately 7 years for a largemouth bass to reach 14 inches in Machickanee Flowage. Growth rates are generally slower compared to northeast Wisconsin averages (Figure 11) but could not be compared to 2003 when no aging structures were taken. The oldest largemouth bass was 19.9 inches and estimated at age 18. There appears to be steady recruitment of largemouth bass, with seventeen age classes being represented. A population estimate for largemouth bass was not generated due to the low number of recaptured fish.

Other Species

Other species captured are listed in Table 2 and include from most to least in abundance: pumpkinseed sunfish, rock bass, golden shiner, bullhead spp. (black, brown, and yellow), bowfin, white sucker, common shiner, smallmouth bass, common carp, fathead minnow, and walleye.

DISCUSSION AND RECOMMENDATIONS

Machickanee Flowage is fairly developed, but large stretches of natural shoreline exist due to the steep banks along parts of the shoreline. Native aquatic vegetation such as coontail and flat-stemmed pondweed provide good habitat. However, shallow areas of the flowage can become overgrown with Northern and Eurasian watermilfoil, making navigation and fishing difficult in places. Due to the low retention time of water in the flowage, chemical treatment of Eurasian watermilfoil is not practical. Stumps and a few fallen trees provide some woody habitat. Additional fish habitat could be gained by the placement of large woody debris as whole, cut trees ("fish sticks") along shorelines that have deep enough water for tree tops to be mostly under water, yet out of the main current of the flowage. Two landowners on the north shore intend to install fish sticks in the winter of 2018. Additional landowners are encouraged to contact WDNR if they are interested in adding fish sticks along their shoreline.

Overall, the fishery of Machickanee Flowage is diverse with good populations of gamefish and panfish. Bluegill and yellow perch were found in much greater numbers in 2017 compared to 2003. Fewer largemouth bass and northern pike were sampled, but size structure remains very good.

I recommend continuing to manage the flowage for panfish, pike, and bass. The 2003 survey report (Meyers 2007²) suggested that a more restrictive northern pike regulation (26-inch minimum, 2 bag) may be warranted following the next survey. However, the current pike regulations appear to be working well. Machickanee Flowage is the only inland waterbody in Oconto County that was recently identified by the WDNR Northern Pike team as providing "quality" northern pike. To meet the criteria of a "quality" pike fishery, the mean length of pike captured in any survey between 1996-2015 must be

² Meyers, L. 2007. Comprehensive fisheries survey of Machickanee Flowage, Oconto County, Wisconsin, during 2003. Found online at <http://dnr.wi.gov/topic/fishing/documents/reports/ocontomachickaneelake2003.pdf>

greater than or equal to 21.5 inches. The 2017 survey results reaffirm the status of a quality northern pike fishery in Machickanee Flowage. Meyers (2007) also mentioned that a reduced bag limit for panfish to promote larger size structure may be a future consideration. Given the significantly higher density of bluegill sampled in both fyke nets and electrofishing in 2017, a reduced bag limit for panfish is not recommended at this time. A reduced bag limit on an already high density bluegill population may lead to overpopulation and stunting rather than increased size structure. No changes to the general fishing regulation are recommended at this time.

The next comprehensive survey for Machickanee Flowage is scheduled for 2027. A comprehensive survey for Oconto Falls Pond is planned for 2018. This survey in the next upstream flowage will allow us to compare fish populations in the two waterbodies in consecutive years.

Table 1– WDNR fisheries surveys completed on Machickanee Flowage from 1995 to 2017.

Date	Survey Type	Effort	Primary survey purpose
May 24, 2017	Electrofishing	4 miles	Gamefish/panfish assessment (SEII)
April 3-12, 2017	Fyke net	65 net nights	Gamefish population estimate & panfish assessment
May 29, 2012	Electrofishing	2 miles	Gamefish/panfish assessment (SEII)
April 2-17, 2003	Fyke net	58 net nights	Gamefish/panfish population estimate & assessment
May 22, 2003	Electrofishing	3 miles	Gamefish/panfish assessment
October 1, 2003	Electrofishing	3 miles	Gamefish/panfish assessment
April 1995	Fyke net	93 net nights	Gamefish population estimate & panfish assessment

Table 2. – Total number, percent of total, average length, and length range of fish species captured with all gear types in 2003 and 2017 in Machickanee Flowage. Numbers include recaptured individuals.

*COMMON NAME OF FISH	2003				2017			
	NUMBER	PERCENT	AVERAGE LENGTH	LENGTH RANGE (inches)	NUMBER	PERCENT	AVERAGE LENGTH	LENGTH RANGE (inches)
Black Crappie	676	13.0%	6.7	3.2 - 13.1	233	1.7%	7.0	3.2 - 12.6
Bluegill	2858	55.1%	5.4	3.2 - 8.9	9158	67.0%	5.8	2.9 - 9.0
Largemouth Bass	397	7.7%	15.1	2.9 - 20.5	194	1.4%	11.5	2.0 - 21.1
Smallmouth Bass	34	0.7%	12.0	6.4 - 18.0	7	0.1%	11.0	7.7 - 13.6
Northern Pike	533	10.3%	21.9	5.5 - 38.0	177	1.3%	22.1	10.3 - 36.3
Pumpkinseed	150	2.9%	5.0	3.3 - 7.4	208	1.5%	5.0	3.9 - 5.7
Rock Bass	174	3.4%	6.0	4.0 - 8.8	51	0.4%		
Yellow Perch	45	0.9%	6.8	4.3 - 8.1	3536	25.9%	7.4	5.6 - 11.4
Walleye	0	0.0%			1	0.0%	21.4	21.4
Common Carp	12	0.2%			3	0.0%		
Bullhead spp.	57	1.1%			30	0.2%		
Bowfin	0	0.0%			14	0.1%		
White Sucker	186	3.6%			14	0.1%		
Northern Hog Sucker	12	0.2%			0	0.0%		
Common Shiner	38	0.7%			8	0.1%		
Golden Shiner	12	0.2%			37	0.3%		
Creek Chub	5	0.1%			0	0.0%		
Fathead Minnow	0	0.0%			1	0.0%		
Total	5,189	100.0%			13,672	100.0%		

Table 3. – Catch summary for spring fyke netting in 2003 and 2017 in Machickanee Flowage. Totals include recaptured individuals.

	2017 Spring Fyke Netting (65 net nights)		2003 Spring Fyke Netting (58 net nights)	
	Total Catch	Catch per net night	Total Catch	Catch per net night
Black Crappie	213	3.3	661	11
Bluegill	8940	138	2446	42
Largemouth Bass	78	1.2	260	4.5
Smallmouth Bass	1	0.0	7	0.1
Northern Pike	167	2.6	525	9.1
Pumpkinseed	203	3.1	128	2.2
Rock Bass	51	0.8	174	3
Walleye	1	0.0	0	0
Yellow Perch	3506	54	39	0.7
Bullhead Sp.	28	0.4	48	0.8
White Sucker	7	0.1	173	3

Table 4. – Catch summary for electrofishing surveys in Machickanee Flowage in 2003 and 2017. Totals include recaptured individuals.

	2017 Spring Electrofishing^a 24-May-2017		2003 Spring Electrofishing^b 22-May-2003		2003 Fall Electrofishing^b 1-Oct-2003	
	Total Catch	Catch per mile	Total Catch	Catch per mile	Total Catch	Catch per mile
Black Crappie	20	20	7	7	8	8
Bluegill	218	218	292	292	120	120
Largemouth Bass	116	29	80	27	57	19
Smallmouth Bass	6	1.5	20	6.7	7	2.3
Northern Pike	10	2.5	2	0.7	6	2
Pumpkinseed	5	5	20	20	2	2
Rock Bass	0	0	0	0	0	0
Walleye	0	0	0	0	0	0
Yellow Perch	30	30	4	4	2	2
Bullhead Sp.	2	2	9	9	0	0
White Sucker	0	0	12	12	1	1

^a Gamefish collected for 4.0 miles shoreline. Panfish also collected for two 1/2 mile stations

^b Gamefish collected for 3.0 miles shoreline. Panfish also collected for two 1/2 mile stations

Figure 1. Locations of 8 fyke nets on Machickanee Flowage, Oconto County, 2017.

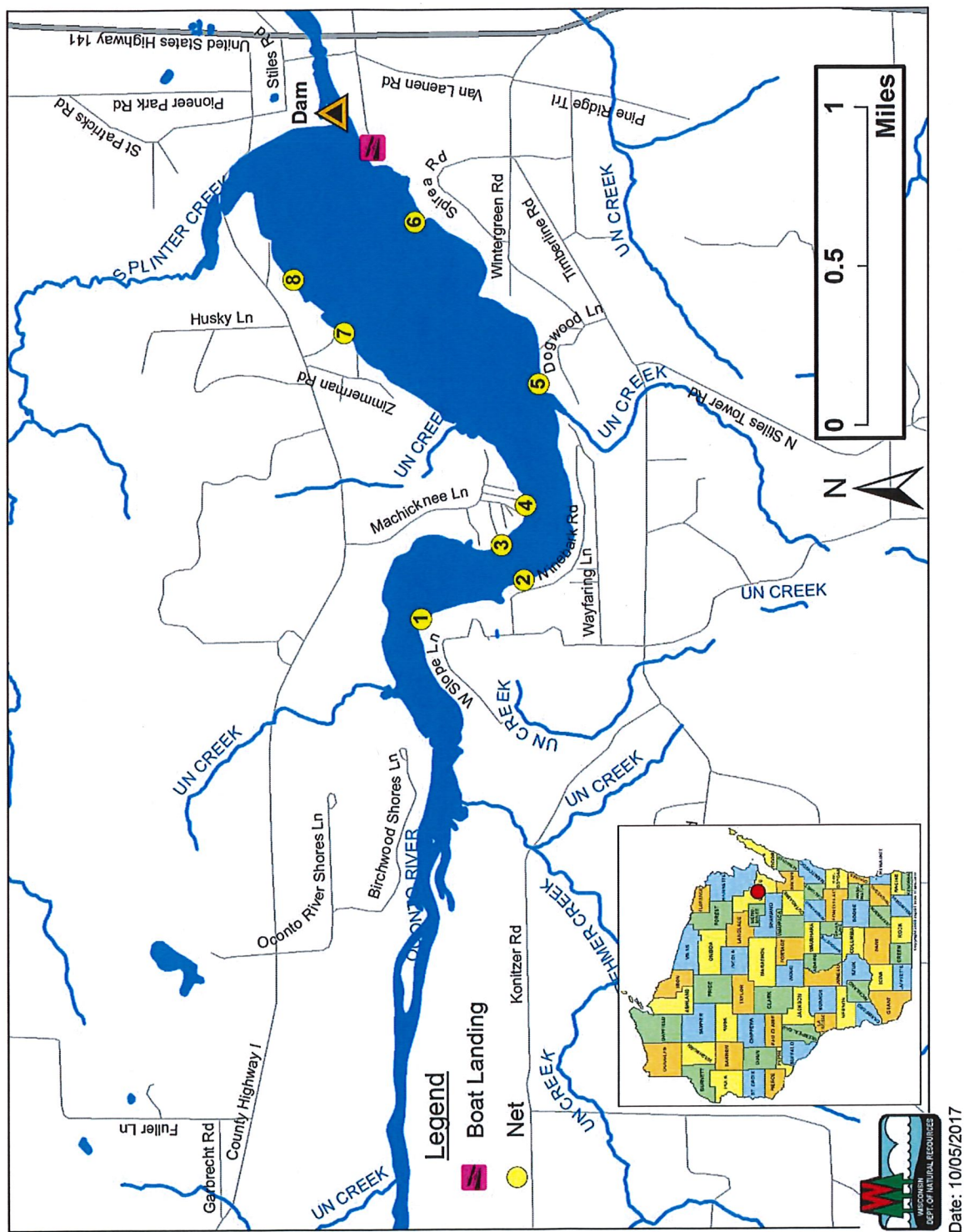


Figure 2. – Bluegill length frequency distribution from Machickanee Flowage surveys, 2003 and 2017.

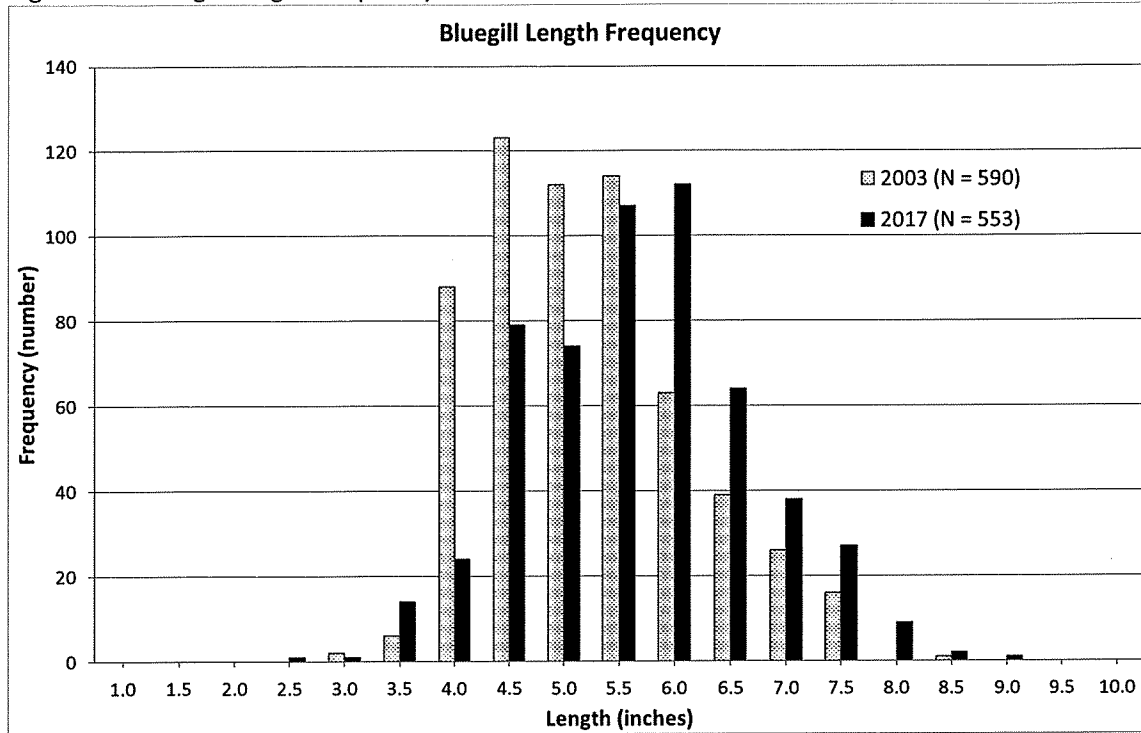


Figure 3. – Bluegill mean length at age, Machickanee Flowage 2017, compared to northeast Wisconsin averages.

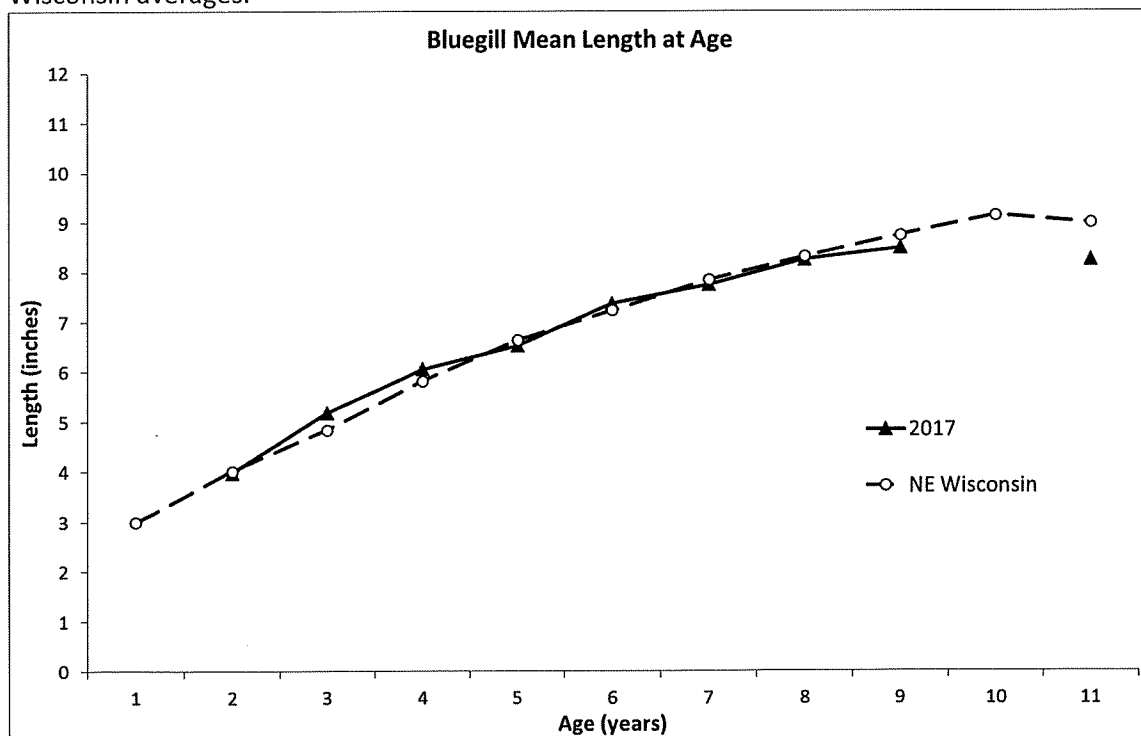


Figure 4. – Black crappie length frequency distribution from Machickanee Flowage surveys, 2003 and 2017.

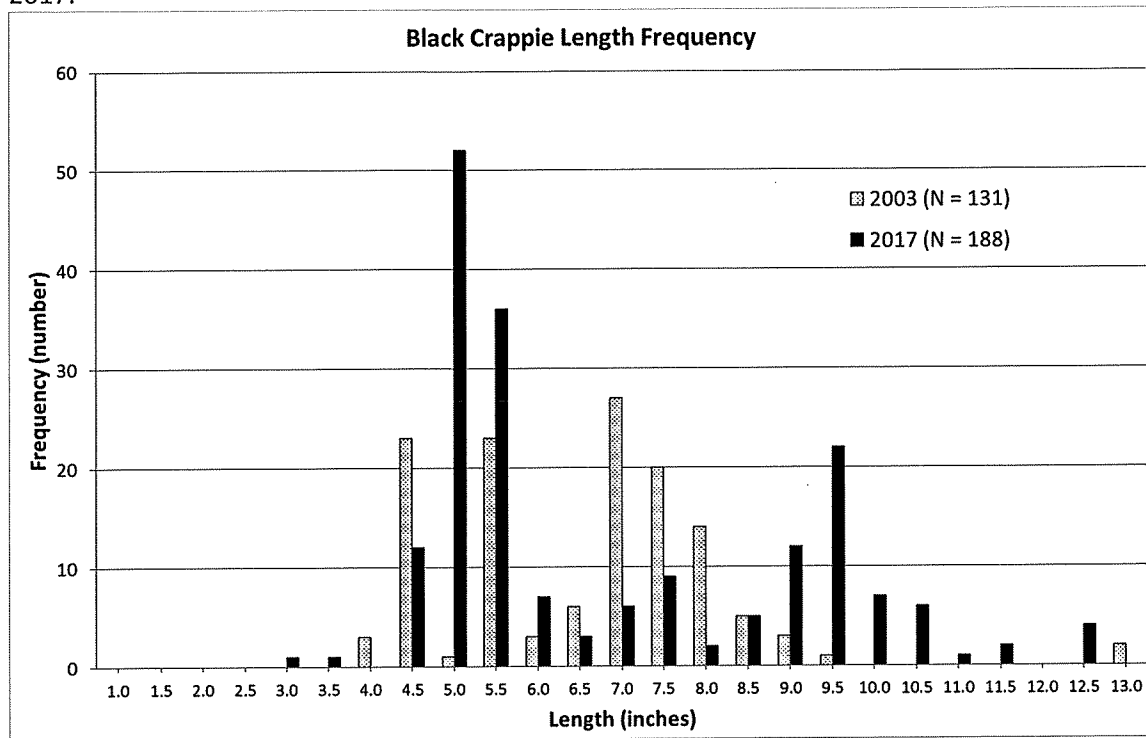


Figure 5. – Black crappie mean length at age, Machickanee Flowage 2017, compared to northeast Wisconsin averages.

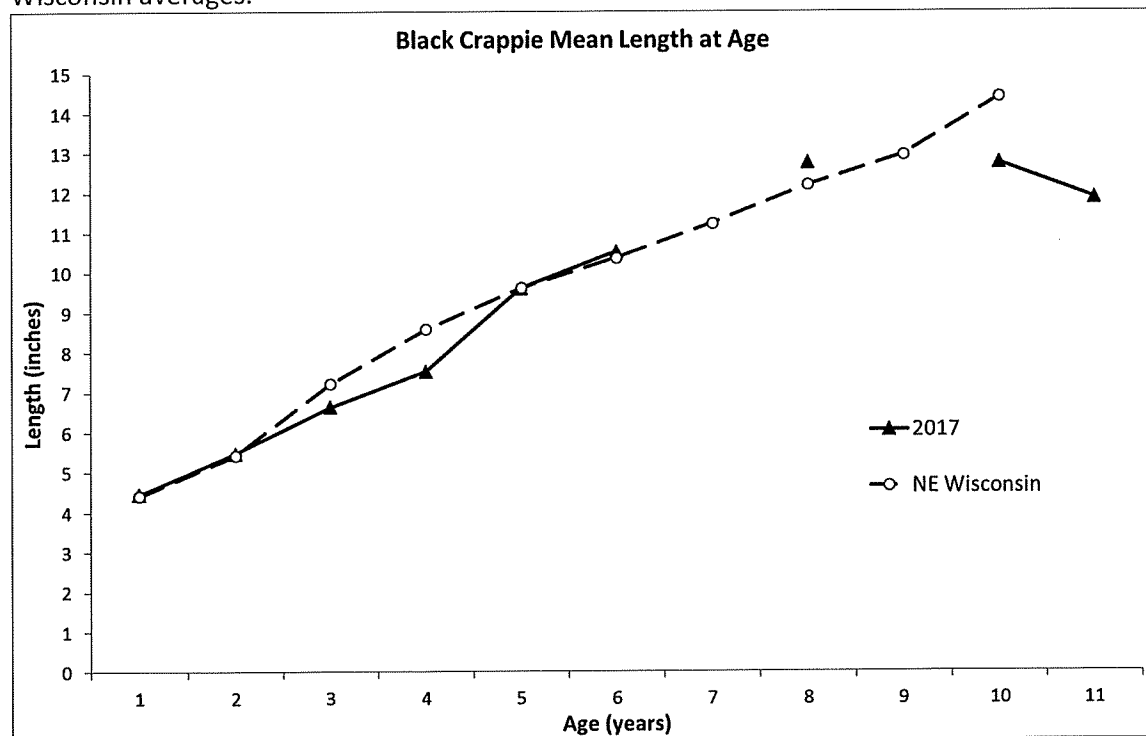


Figure 6. – Yellow perch length frequency distribution from Machickanee Flowage surveys, 2003 and 2017.

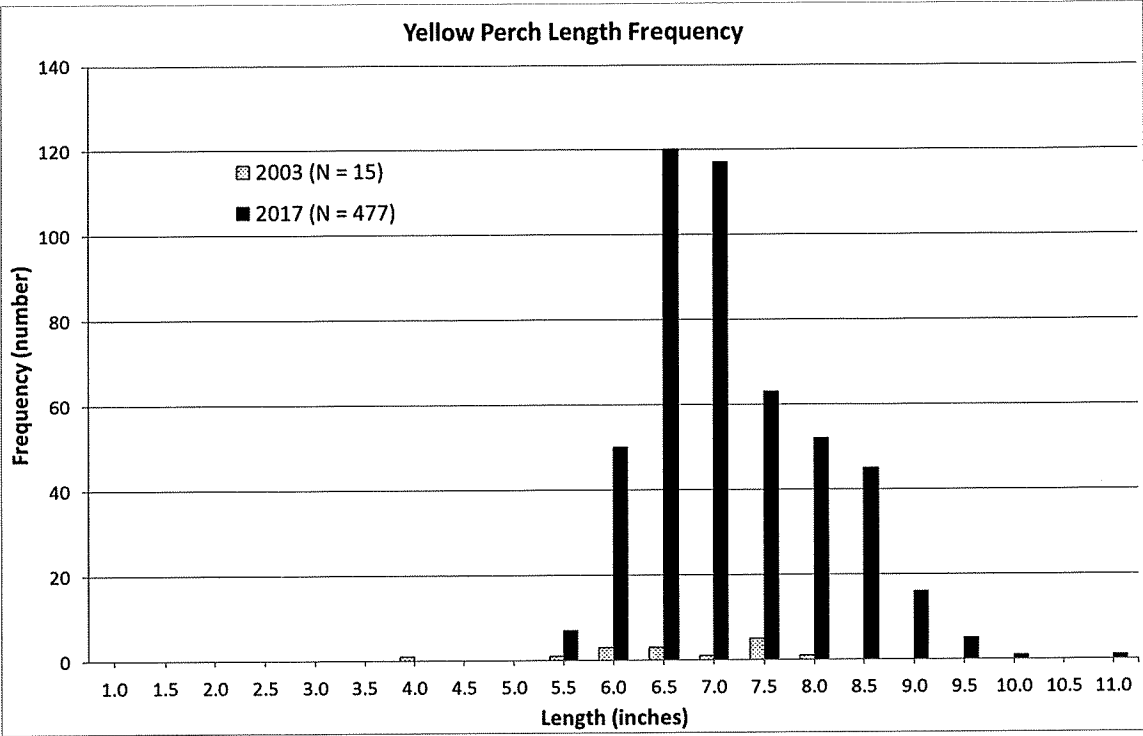


Figure 7. – Yellow perch mean length at age, Machickanee Flowage 2017, compared to northeast Wisconsin averages.

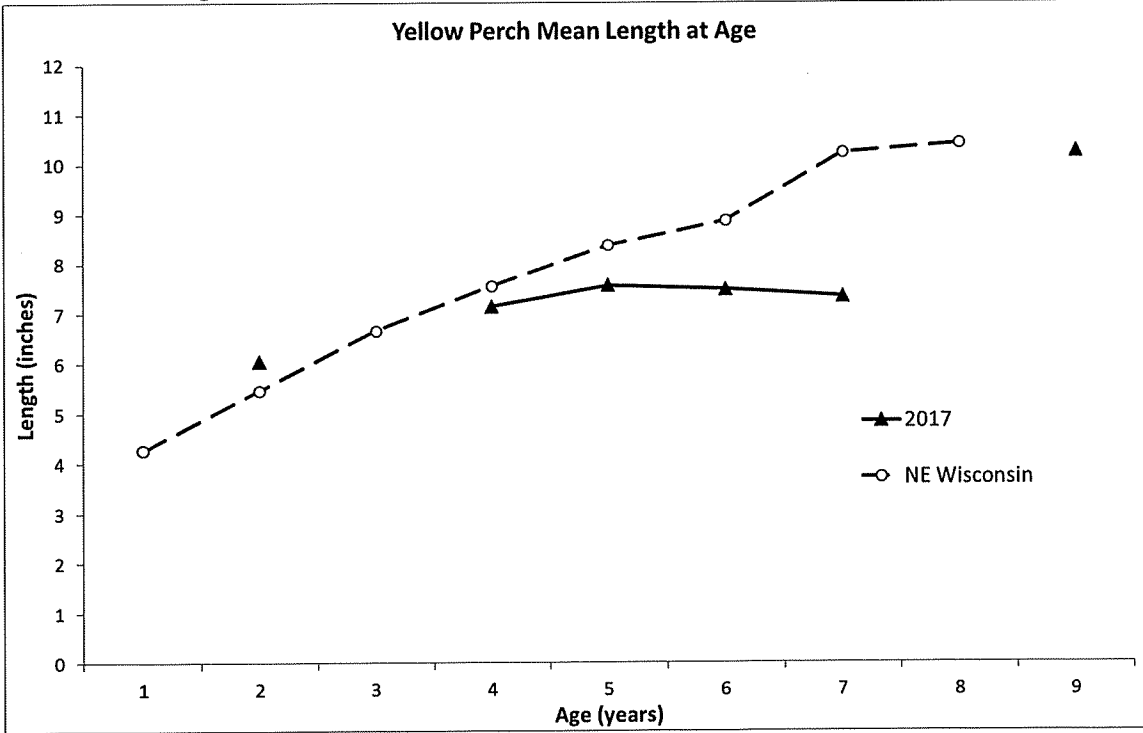


Figure 8. – Northern pike length frequency distribution from Machickanee Flowage surveys, 2003 and 2017.

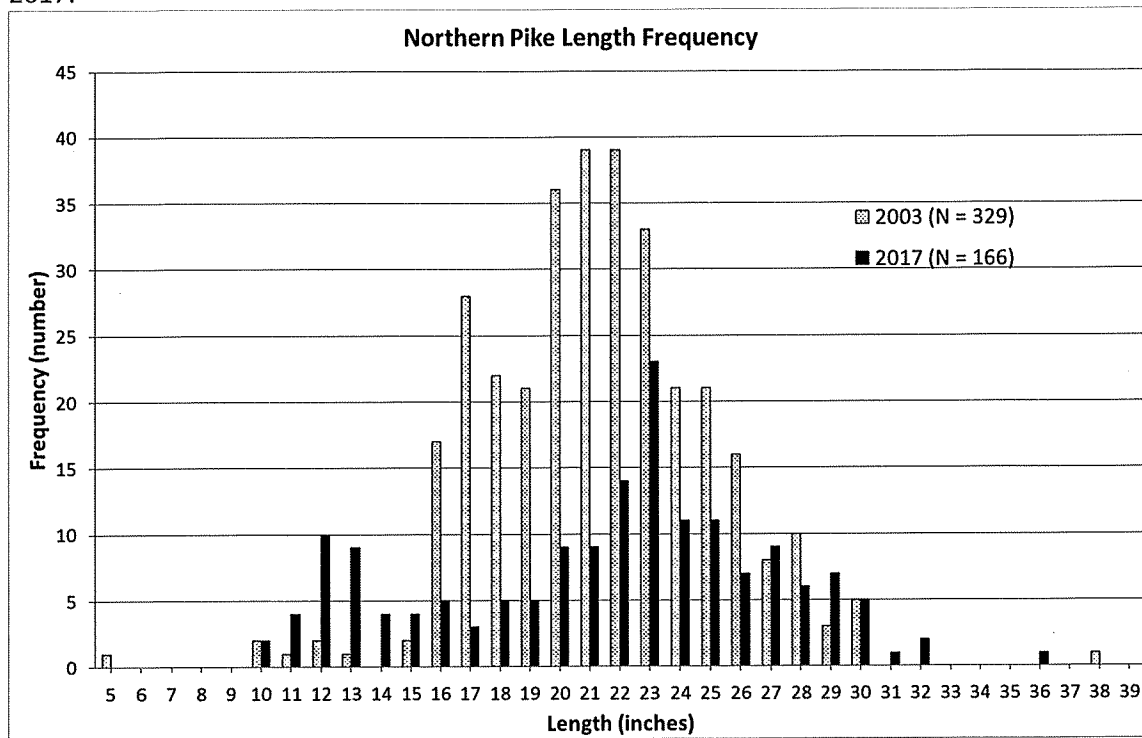


Figure 9. – Northern pike mean length at age, Machickanee Flowage 2017, compared to northeast Wisconsin averages.

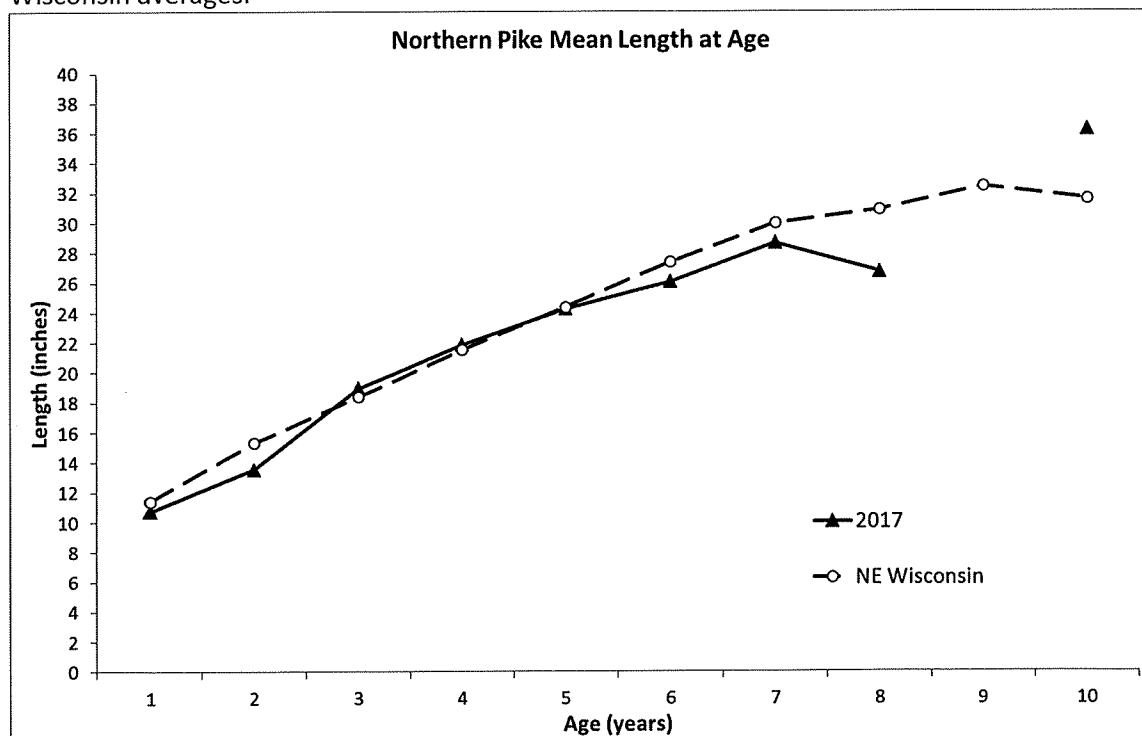


Figure 10. – Largemouth bass length frequency distribution from Machickanee Flowage surveys, 2003 and 2017.

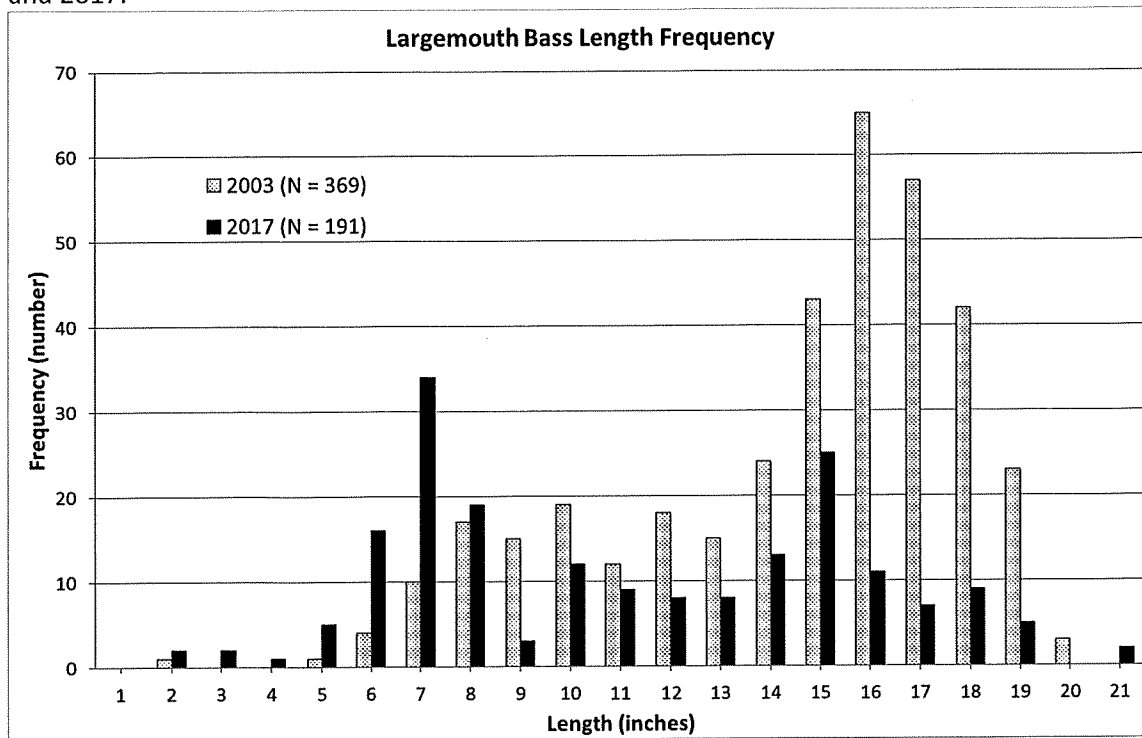
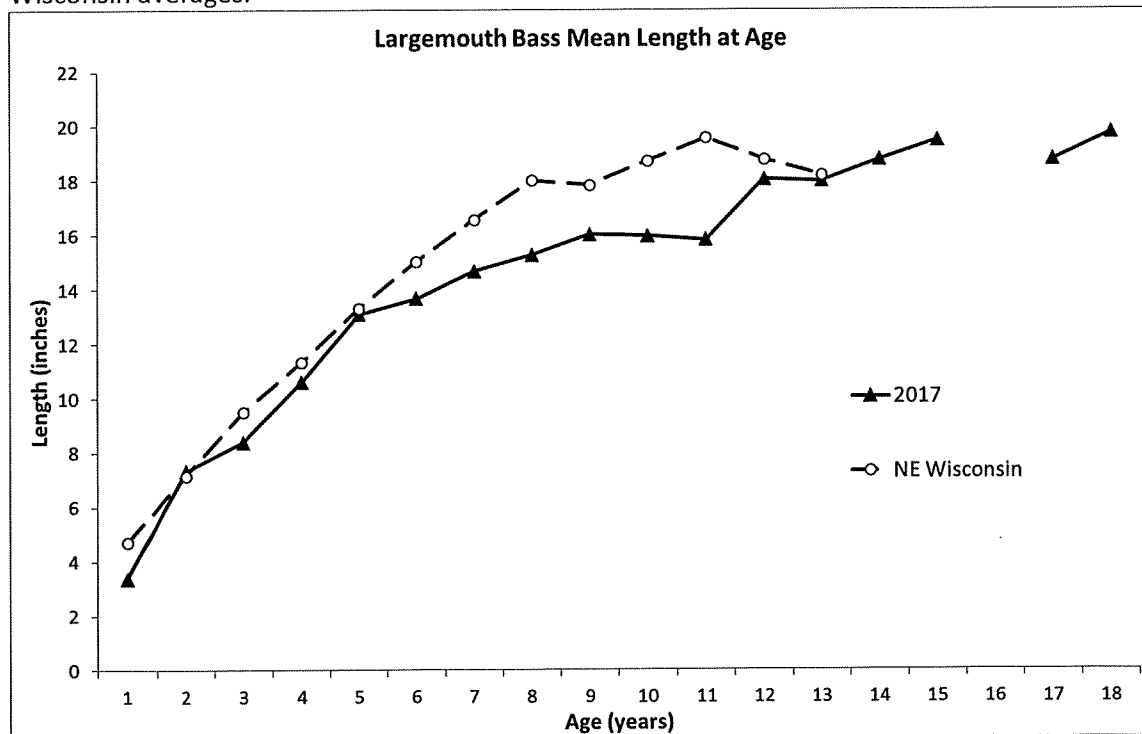


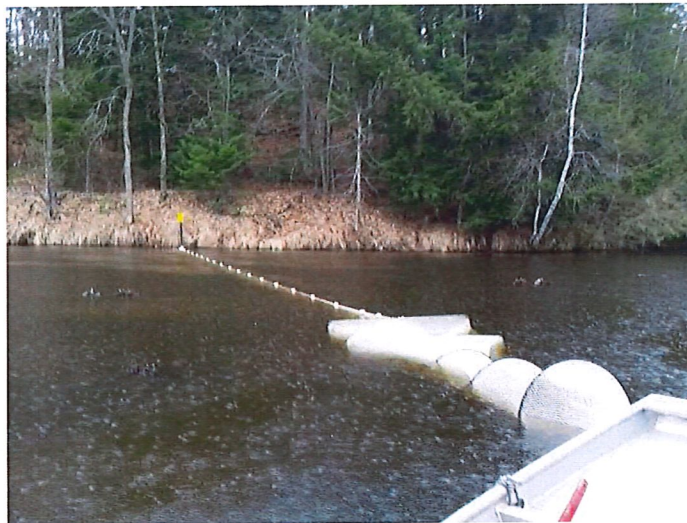
Figure 9. – Largemouth bass mean length at age, Machickanee Flowage 2017, compared to northeast Wisconsin averages.



Appendix – Photos



Machickanee Flowage shoreline with Net 4 set in the water.



Fyke net (Net 1) set near stump field on Machickanee Flowage.



A typical mix of bluegill and yellow perch captured in a fyke net.



Ron Rhode holds a 36.3 inch female northern pike collected in April 2017 from Machickanee Flowage.



A few trailers and a shore angler at the boat landing on Machickanee Flowage in April 2017.



Stiles dam forms the impoundment for Machickanee Flowage. The dam has a head of 19 feet, is owned by Oconto Electric Cooperative, and was built in 1949. View looking downstream (east) towards the dam.